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मानक

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IS 1103 (1984): Brushes, artist's [CHD 24: Brushware]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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**IS : 1103 -1984**

***Indian Standard***  
**SPECIFICATION FOR BRUSHES, ARTISTS'**  
**( *Third Revision* )**

UDC 687.978 : 75.022.21



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**INDIAN STANDARDS INSTITUTION**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

**AMENDMENT NO. 2 SEPTEMBER 2004  
TO  
IS 1103 : 1984 SPECIFICATION FOR  
BRUSHES, ARTISTS'**

**( Third Revision )**

( *Page 9, clause 7.1* ) — Substitute 'Lindane 6.5% DP (*see* IS 14834 : 2000\*) or methyl parathion 2% DP (*see* IS 8960 : 1978§)' for 'DDT Dusting powder (*see* IS 564 - 1975\*)'.

( *Page 9, footnote marked \** ) — Substitute the following for the existing:

'\*Lindane dusting powder — Specification.'

( *Page 9, footnotes* ) — Insert the following footnote at the end:

'§Specification for methyl parathion dusting powders.'

( CHD 24 )

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Reprography Unit, BIS, New Delhi, India

**AMENDMENT NO. 1 MAY 2002  
TO  
IS 1103 : 1984 SPECIFICATION FOR BRUSHES,  
ARTISTS'**

**( Third Revision )**

( *Page 3, clause 0.2.3* ) — Substitute the following for the existing text:

**'0.2.3** In this revision the number of sizes has been increased to the original 13 sizes since a wide section of buyers, namely, commercial artists, art colleges and some organized consumers, preferring the range of 13 sizes.'

( *Page 4, clause 1.1* ) — Substitute the following for the existing text:

**'1.1** The standard prescribes the requirements, methods of tests and sampling for artists' brushes filled with goat hair, natural colour or thin tapered nylon, monofilament and set in a suitable cement.'

( *Page 4, clause 3.1* ) — Substitute the following for the existing text:

**'3.1** There shall be two grades of material, namely:

Grade 1 — With goat hair, natural colour

Grade 2 — With nylon monofilament'

( *Page 4, clause 5.1.1.1* ) — Substitute the following for the existing:

**'5.1.1.1** For grade 1 — Goat hair shall be of natural colour, properly straightened and free from admixture. As regards colour, lustre, flexibility and stiffness, the hair shall match with that used in the approved tender sample.'

( *Page 4, clause 5.1.1.2* ) — Substitute the following for the existing text:

**'5.1.1.2** For grade 2 — The nylon monofilament shall be thin and tapered and shall match with that in the approved tender sample.'

( *Page 6, clause 5.1.3, line 3* ) — Substitute 'and' for 'end'

( *Page 8, clause 5.5.2* ) — Substitute the following for the existing:

**'5.5.2 Performance Test** — Artists' brushes shall be subjected to performance test with water and paint.'

( CHD 24 )

# Indian Standard

## SPECIFICATION FOR BRUSHES, ARTISTS'

### ( Third Revision )

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'5.1	Director General, ISI ( Ex-officio Member )
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*Secretary*

SHRI P. S. ARORA  
Senior Deputy Director ( Chem ), ISI

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**IS : 1103 - 1984**

*( Continued from page 1 )*

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*Indian Standard*  
**SPECIFICATION FOR BRUSHES, ARTISTS'**  
*( Third Revision )*

**0. FOREWORD**

**0.1** This Indian Standard ( Third Revision ) was adopted by the Indian Standards Institution on 15 January, 1984, after the draft finalized by the Brushware Sectional Committee had been approved by the Chemical Division Council.

**0.2** This standard was originally issued in 1957. It covered the minimum requirements of artists' brushes which are filled with sable or squirrel-tail hair and set in a suitable cement.

**0.2.1** In its first revision ( 1963 ), certain modifications in overall length and protruded length of the filling material and an additional size ( No. 0 ) was incorporated in addition to the statistical sampling plan and criteria for conformity.

**0.2.2** In the second revision in 1971, the number of sizes of artists' brushes were reduced from 13 to 9 and a method of test for determination of moisture content of wood used for handles was incorporated.

**0.2.3** In this revision, the number of sizes has been increased to the original 13 sizes since a wide section of buyers, mainly, commercial artists, art colleges and some organized consumers, preferred the range of 13 sizes. Moreover, in this revision two grades of brushes are being covered, namely, Grade 1 with sable and squirrel hairs, and Grade 2 with mongoose hair.

**0.3** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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\*Rules for rounding off numerical values ( revised ).

## **1. SCOPE**

**1.1** This standard prescribes the requirements, methods of test and sampling for artists' brushes filled with sable or squirrel-tail hair or mongoose hair and set in a suitable cement.

## **2. TERMINOLOGY**

**2.1** For the purpose of this standard, definitions given in IS : 5060-1969\* and IS : 707-1976† and the following shall apply.

**2.2 Approved Tender Sample** — The sample accepted by the indenter or an inspection authority as the basis for supply. When a sample is tested and approved by the purchaser or an inspection authority, the results of such tests as will permit the supplier to meet the limits imposed by the specification for deliveries shall be made available to the supplier.

## **3. GRADES**

**3.1** There shall be two grade of the material, namely:

*Grade 1* — With sable or squirrel tail hair, and

*Grade 2* — With mongoose hair.

## **4. SIZES**

**4.1** The artists' brushes shall be of 13 sizes with the denominations as given in col 2 of Table 1.

## **5. REQUIREMENTS**

**5.1 Materials** — The brushes shall be manufactured from the following materials.

### **5.1.1 Filling Material**

**5.1.1.1 For grade 1** — Sable hair or imported squirrel-tail hair shall be used. The filling material used shall match with that used in the approved tender sample.

**5.1.1.2 For grade 2** — Mongoose hair shall be of a natural colour, properly straightened and free from admixture. As regards colour, lustre, flexibility and stiffness, the hair shall match those used in the approved tender sample.

**5.1.2 Timber** — Any of the timber species listed in Appendix A shall be used in the manufacture of handles of the brushes.

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\*Glossary of terms used in brushware industry.

†Glossary of terms applicable to timber technology and utilization ( *second revision* ).

TABLE 1 REQUIREMENTS FOR BRUSHES ARTISTS'

( Clauses 4.1 and 5.2.1 )

Sl. No.	Size No.	PROTRUSION OF HAIR (A)	FERRULE			LENGTH OF HANDLE CUT OF FERRULE, Min (E)	OVERALL LENGTH OF HAIR
			Diameter at Mouth (Internal) (B)	Diameter at Bottom (Internal) (C)	Length (D)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		mm	mm	mm	mm	mm	mm
i)	A-0	6.5	0.9	3.0	30.0	125	25.0
ii)	A-1	8.0	1.5	3.0	30.0	125	25.0
iii)	A-2	9.5	2.0	4.0	30.0	135	25.0
iv)	A-3	11.0	2.5	5.0	30.0	135	25.0
v)	A-4	14.5	3.0	5.5	30.0	140	25.0
vi)	A-5	16.0	3.5	6.0	35.0	140	28.0
vii)	A-6	18.0	4.0	6.5	35.0	140	28.0
viii)	A-7	21.0	4.5	7.0	35.0	150	28.0
ix)	A-8	22.5	5.0	7.5	35.0	150	32.0
x)	A-9	25.0	4.5	8.5	35.0	150	32.0
xi)	A-10	27.0	6.5	9.0	35.0	155	32.0
xii)	A-11	28.5	7.0	10.0	40.0	155	35.0
xiii)	A-12	30.0	8.0	12.0	40.0	155	38.0

NOTE — Letters A to E correspond to those given in Fig. 1.

**5.1.2.1** The timber shall be reasonably straight-grained and well-seasoned to a moisture content not exceeding 15 percent when tested by the moisture meter or in case of dispute by the oven dry method given in Appendix B.

**5.1.2.2** The timber shall be free from brashness, any kind of biological or non-biological deterioration, insect attack, centre-heart (pith), knots except live pin knots, cracks, warp and any other defect which may reduce the life of the brush or affect its utility.

**5.1.3 Ferrule** — The ferrule shall be made of 0.27 mm to 0.31 mm thick nickel-plated, brass sheet or aluminium sheet. The ferrule shall be seamless or lapped end soldered.

**5.1.4 Cement** — Any suitable cement capable of satisfying the test specified under 5.5 may be used.

**5.1.5 Silk Thread** — A suitable silk thread for binding the hair of brushes shall be used.

## 5.2 Dimensions of Tolerances

**5.2.1 Dimensions** — The brushes shall conform to the dimensions given in Table 1.

**5.2.2 Tolerances** — The tolerances of the linear dimensions shall be as follows:

<i>Nominal Dimension</i>	<i>Tolerance</i>
	mm
Up to 15 mm	± 1.0
Over 15 mm but below 40 mm	± 2.0
40 mm and above	± 3.0

Tolerance for the length of hair out of ferrule  $\pm \begin{smallmatrix} 1.0 \\ 0 \end{smallmatrix}$  mm.

## 5.3 Manufacture

**5.3.1** The brushes shall generally conform to the shape and design as shown in Fig. 1.

**5.3.1.1** The ferrule, if lapped, shall be properly soldered.

**5.3.1.2** The handle shall be shaped to suit the ferrule.

**5.3.1.3** The hair shall be properly bound with the silk thread and cemented to form a tuft which shall be securely set inside the ferrule. The tuft shall be free from loose hair.

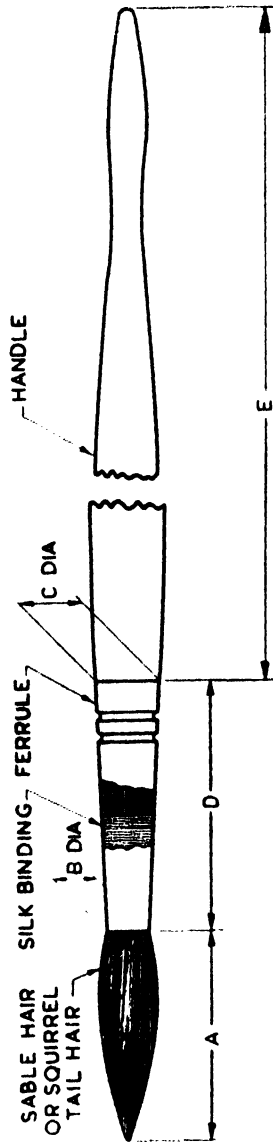


FIG. 1 BRUSH, ARTISTS'

## **5.4 Workmanship and Finish**

**5.4.1** The handle shall be finished smooth all over and shall be properly varnished or lacquered.

**5.4.2** The ferrule shall be free from sharp edges.

**5.4.3** The ferrule shall be properly secured to the handle and clinched as shown in Fig. 1.

**5.4.4** The ferrule of different sizes of brushes shall be completely filled with filling material. This shall be ascertained by pressing the filling material from one side near the ferrule.

**5.4.5** In general workmanship and finish, the brushes shall match the approved tender sample.

## **5.5 TEST REQUIREMENTS**

**5.5.1 Pull Test** — The tuft of the filling material of the brush shall not come out when subjected to a straight pull with thumb and finger grip. Hairs coming out of the cement shall be deemed as failure.

**5.5.2 Performance Test** — Artists' brushes shall be subjected to performance test with water in all cases. However, artists' brushes may also be subjected to performance test with paint, in case of sable hair brushes only.

**5.5.2.1 Test with water** — The tuft of the filling material of the brush, when dipped in water till thoroughly wet, then withdrawn and given a light jerk, shall assume the shape as shown in Fig. 1.

**5.5.2.2 Test with paint** — Dip the tuft of the filling material of the brush in a paint of viscosity 150 to 200 seconds ( measured in Ford-Cup viscometer No. 4 ) and stir it to moisten the same with the paint. Withdraw the tuft and squeeze out the excess paint from the filling material by pressing the same on a palette with a circular movement in such a way that the tuft makes an angle of 10° to 15° with the palette and the handle at an angle of 30° to 40° with the palette as shown in Fig. 2. Simultaneously, draw this brush with a gradual release of pressure and thus increase the inclination of the tuft and the handle with the paletter. Continue the entire process for 2 to 3 times, till the excess paint is squeezed and the tuft attains the shape as shown in Fig. 1. Withdraw the brush from the palette and see if the shape is retained and there is no spreading out of the hair.

## **6. MARKING**

**6.1** Unless otherwise agreed to between the indenter or inspection authority and the supplier, each brush shall be legibly and indelibly marked or stamped with the manufacturer's name or recognized trade-mark, if any; grade of the brush, the year of manufacture, the warranty of the filling material and the size denomination of the brush.

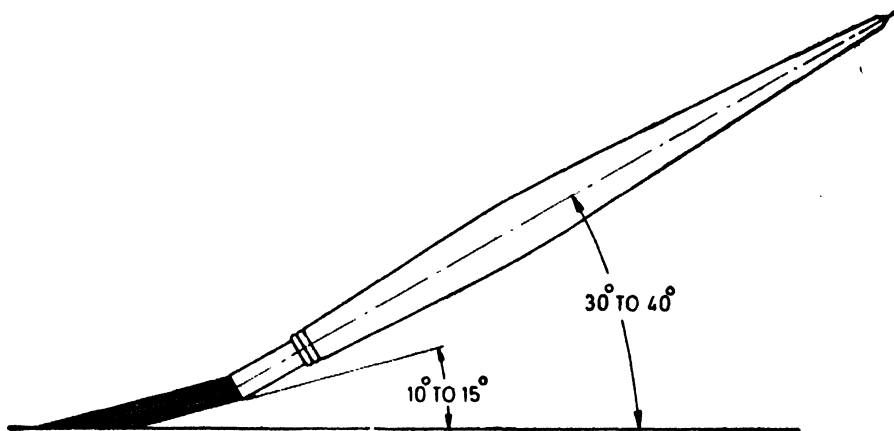


FIG. 2 PERFORMANCE TEST WITH PAINT

**6.1.1** The brushes may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

**7. PRESERVATION**

**7.1** The filling material of the brushes shall be liberally dusted before packing, with a mixture of 5 parts ( by mass ) of DDT dusting powder ( see IS : 564-1975\* ) and 95 parts ( by mass ) of French chalk ( see IS : 380-1978† ) or talc powder. Alternatively, pieces of naphthalene balls ( see IS : 539-1974‡ ) shall be used in the packing box for the brushes.

**8. PACKING**

**8.1** The brushes shall be packed as agreed to between the purchaser and the supplier.

**9. TENDER SAMPLES AND SAMPLING**

**9.1 Tender Samples** — The supplier shall submit four identical tender samples of brushes of each denomination and grade and quality for approval.

**9.1.1** The indenter or inspection authority shall retain one of the four approved tender samples against each item, till the completion of order.

**9.2 Sampling** — The method of drawing representative samples of the brushes and the criteria for conformity shall be as prescribed in Appendix C.

\*Specification for DDT dusting powders ( second revision ).

†Specification for French chalk, technical ( second revision ).

‡Specification for naphthalene ( second revision ).

## APPENDIX A

( Clause 5.1.2 )

SPECIES OF TIMBER FOR THE MANUFACTURE OF  
HANDLES FOR ARTISTS' BRUSHES

**A-1.** The list of the species of timber approved for the manufacture of handles for lettering brush is given below:

Standard Trade Name		Botanical Name
Romon	Devanagari	
aini	ऐनी	<i>Artocarpus hirsuta</i> Lamk., fam. Moraceae
banati	बनाती	<i>Lophopetalum wightianum</i> Arn., fam. Celastraceae
bijasal	बीजसाल	<i>Pterocarpus marsupium</i> Roxb., fam. Leguminosae
champak	चम्पक	<i>Michelia champaca</i> Linn., fam. Magnoliaceae
chickrassi	चिकरासी	<i>Chukrasia tabularis</i> A. Juss., fam. Meliaceae
dhaman	धामन	<i>Grewia tiliifolia</i> Vahl., fam. Tiliaceae
gamari (gumhar)	गमारी (गुम्हार)	<i>Gmelina arborea</i> Roxb., fam. Verbenaceae
haldu	हल्दू	<i>Adina cordifolia</i> Hook. f., fam. Rubiaceae
kaim	कैम	<i>Mitragyna parvifolia</i> (Roxb.) Korth., syn. <i>Stephegyne parvifolia</i> Korth., fam. Rubiaceae
kanju	कांजू	<i>Holoptelea integrifolia</i> Planch., fam. Ulmaceae
kathal	कटहल	<i>Artocarpus heterophyllus</i> Lamk., syn. <i>A. integrifolia</i> Linn. f., fam. Moraceae
kuthan	कूथन	<i>Hymenodictyon excelsum</i> Wall., fam. Rubiaceae
lambapatti	लम्बापत्ती	<i>Planchonella longipetiolatum</i> H. J. Lam., syn. <i>Sideroxylon longipetiolatum</i> King et Prain, fam. Sapotaceae
nim-chameli	नीम-चमेली	<i>Millingtonia hortensis</i> Linn f., fam. Bignoniaceae
kodapalai choupaini (piney)	कोडपलई चौपेनी (पिने)	<i>Kingiodendron pinnatum</i> (Roxb.) Harms, syn. <i>Hardwickia pinnata</i> Roxb., fam. Leguminosae
toon	तून	<i>Toona ciliata</i> Roem., syn. <i>Cedrela toona</i> Roxb., fam. Meliaceae



**APPENDIX B**

( Clause 5.1.2.1 )

**DETERMINATION OF MOISTURE CONTENT FOR  
TIMBER USED IN BRUSHES, ARTISTS'****B-1. TEST SPECIMEN**

**B-1.1** The entire block used in artists' brushes may form the test specimen for determination of moisture content or a coupon cut from the test specimen may, as well, be used for moisture content determination. When for any reason additional determination of moisture content is required, separate samples shall be prepared from the sample material as is used in preparing the test specimens. Smaller specimens may be used when deemed necessary. The test shall be carried out immediately after cutting the specimen.

**B-2. PROCEDURE**

**B-2.1** Weigh accurately each test specimen. This specimen shall then be dried in a ventilated oven at a temperature of  $105 \pm 2^{\circ}\text{C}$  until the mass becomes constant between two successive weighings made at an interval of not less than one hour.

**B-3. CALCULATION**

**B-3.1** The moisture content, expressed as a percentage of the oven-dry mass is given by the formula:

$$\frac{M_1 - M_o}{M_o} \times 100$$

where

$M_1$  = initial mass in g of the test specimen, and

$M_o$  = oven-dry mass in g of the test specimen.

**APPENDIX C**

( Clause 9.2 )

**SAMPLING AND CRITERIA FOR CONFORMITY FOR  
BRUSHES, ARTISTS'****C-1. SAMPLING**

**C-1.1 Lot** — In any consignment, all the brushes of the same size and quality shall be divided into groups of 500 brushes or less and each such group shall constitute a lot. Care shall be taken to ensure that brushes included in a lot do not differ in construction, as far as possible.

**C-1.1.1** The conformity of the brushes in a lot to the requirements of this specification shall be ascertained for each lot separately. The number of brushes to be selected for this purpose shall be in accordance with col 1 and 2 of Table 2.

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**TABLE 2 SCALE OF SAMPLING**

No. of BRUSHES IN A LOT		No. of BRUSHES TO BE SELECTED
$N$		$n$
(1)		(2)
Up to	10	2
11 „	25	3
26 „	50	4
51 „	100	5
101 „	150	6
151 „	300	7
301 „	500	8
501 „	750	9
751 „	1 000	10

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**C-1.1.2** The brushes shall be selected at random. To ensure randomness of selection, one of the following procedures is recommended for use:

- a) If all the brushes in a lot are packed in one box, then starting from any brush, count them in any suitable order as 1, 2, ....., up to  $r$  and so on, where  $r$  is the integral part of  $N/n$  ( $N$  and  $n$  being the lot size and sample size respectively). Every  $r$ th brush thus counted shall be withdrawn to constitute the sample.
- b) If the brushes in a lot are packed in more than one box, approximately equal number of brushes shall be picked at random from as many boxes as possible so as to obtain the required number of brushes as specified in Table 2.

## **C-2. NUMBER OF TEST**

**C-2.1** Tests for the characteristics shall be conducted on the individual brushes in the sample.

## **C-3. CRITERIA FOR CONFORMITY**

**C-3.1** For declaring the conformity of the lot to the requirements of this specification, all the brushes selected according to C-1.1.2 shall satisfy the relevant requirements given under 5.

# INTERNATIONAL SYSTEM OF UNITS ( SI UNITS )

## Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous Intensity	candela	cd
Amount of substance	mole	mol

## Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

## Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg.m/s <sup>2</sup>
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz = 1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>

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